



Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 8804 (1993): Plugs, sockets and terminal arrangements and welding cable connectors for manual welding equipment [ETD 21: Electric Welding Equipment]

“ज्ञान से एक नये भारत का निर्माण”

Satyanaaranay Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartṛhari—Nītiśatakam

“Knowledge is such a treasure which cannot be stolen”



BLANK PAGE



PROTECTED BY COPYRIGHT

भारतीय मानक

मैनुअल वेल्डिंग उपस्कर के लिए प्लग, सॉकेट, टर्मिनल
व्यवस्था और वेल्डिंग केबल संयोजक – विशिष्ट

(पहला पुनरीक्षण)

Indian Standard

PLUGS, SOCKETS, TERMINAL ARRANGEMENTS
AND WELDING CABLE CONNECTORS FOR
MANUAL WELDING EQUIPMENT —
SPECIFICATION

(*First Revision*)

UDC 621.316.541 : 621.791.75.03

© BIS 1993

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Electric Welding Equipment Sectional Committee had been approved by the Electrotechnical Division Council.

This standard deals with plugs, sockets, terminal arrangements and welding cable connectors for manual arc welding equipment.

In the preparation of this standard, assistance has been derived from the following:

IEC Publication 501 (1975) Safety requirements for arc welding equipment — plugs, socket-outlets and couplers for welding cables. International Electrotechnical Commission.

BS 638 : 1966 Specification for arc welding plant, equipment and accessories. British Standards Institution.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

PLUGS, SOCKETS, TERMINAL ARRANGEMENTS AND WELDING CABLE CONNECTORS FOR MANUAL WELDING EQUIPMENT — SPECIFICATION

(*First Revision*)

1 SCOPE

1.1 This standard lays down the requirements and tests for plugs, sockets, terminal arrangements and welding cable connectors for manual arc welding equipment.

1.2 The requirements and tests for plugs, sockets, terminal arrangements and welding cable connectors for automatic and semi-automatic welding equipment shall be a matter of agreement between the manufacturer and the purchaser.

2 REFERENCES

The Indian Standards listed below are necessary adjuncts to this standard:

IS No.	Title
191 (Part 5) : 1991	Copper (<i>third revision</i>)
1570 : 1961	Schedules for wrought steels for general engineering purposes
4170 : 1967	Brass rods for general engineering purposes

3 TERMINOLOGY

3.0 For the purpose of this standard, the following definitions shall apply.

3.1 Plug and Socket

Plug and socket is a bayonet-type device for easy connection of a flexible cable, to a fixed wiring. It consists of two parts.

3.1.1 Plug

Plug is the part integral with or intended to be attached to, the flexible cable connected to the equipment.

3.1.2 Socket

Socket is the part intended to be installed with the fixed wiring.

3.2 Terminal

Terminal is a device for easy connection with nuts and studs or bolts, of a flexible cable, to a fixed wiring.

3.2.1 Retaining Device

Retaining device is a mechanical arrangement which holds a plug in position when it is in proper engagement and prevents its unintentional withdrawal.

3.3 Welding Cable Connector

It is a device to connect any two length of flexible welding cable by means of a male plug and a female socket with spring loaded bayonet cap arrangement.

3.4 Type Tests

Tests carried out to prove conformity with the specification. These are intended to prove the general qualities and design of plugs, sockets and terminal arrangements for manual arc welding equipment.

3.5 Acceptance Tests

Tests carried out on samples taken from a lot for the purpose of acceptance of the lot.

3.6 Routine Tests

Tests carried out on each plug, socket and terminal arrangements to check requirements which are likely to vary during production.

4 RATED CURRENT

4.1 It denotes the current assigned to the accessory by the manufacturer.

4.1.1 Rating

The preferred current ratings at a duty cycle of 60 percent (3 minutes 'ON' and 2 minutes 'OFF') shall be 200, 400 and 600 A.

5 CONSTRUCTION

5.1 Plugs and Sockets

5.1.1 The metal part of the plug shall be encased in tough, heat resisting insulating material such that live parts are fully isolated when they are connected to the welding equipment.

5.1.2 It shall be possible to lock the plug adequately by means of a retaining device.

5.1.3 Plugs and sockets shall be robust in construction and shall be capable of maintaining efficient electrical and mechanical contact in normal use.

5.1.4 The construction of plugs and sockets shall be such that no foreign particle liable to cause a risk of electric shock may enter gaps, holes or other crevices and that live metal parts, such as the ends of screws and pins cannot become exposed.

5.1.5 Sockets when fitted to the equipment shall be shrouded by being sunk into the housing or by similar methods to avoid inadvertent contact with live parts when uncoupled from the plug.

5.1.6 When a socket is fitted to an equipment, the distance between the end of the metal socket and the end of the shroud or the equipment housing or the insulated body shall be at least 3 mm but shall not exceed 14 mm.

5.1.7 The insulation of the cable shall enter the plug to a depth of at least twice the outer diameter of the cable to minimize the risk of damage to the cable due to flexing.

5.1.8 The basic design and construction details for Type A, Type B and Type C plugs and sockets are given in Fig. 1 (A, B and C), 2 and 3 respectively. Variations are permissible which do not affect performance requirement, interchangeability or safety features of the plugs and sockets specified in this standard.

5.1.9 Adequate means of appropriate rating shall be provided for permanently connecting the plug to cables or socket to the fixed wiring.

5.2 Terminals

5.2.1 Terminals shall be robust in construction and shall be capable of maintaining efficient electrical and mechanical contact in normal use.

5.2.2 Type X terminals shall be so designed as to present rotational movement of the terminals or the welding cable-lugs connected to them.

5.2.3 Terminals when fitted to equipment shall be suitably shrouded to avoid inadvertent contact with them.

5.2.4 When the terminal is fitted to equipment, the distance between the end of the terminal and the end of the shroud or the equipment housing shall be at least 8 mm but shall not exceed 14 mm.

5.2.5 The construction of the terminals shall be such that when cables are connected and during use there shall not be any possibility of short circuiting, accidental or otherwise, between the cable-lugs or between the cable-lugs and equipment housing.

5.2.6 Figures 4 and 5 respectively show the basic design, construction and dimensional details for Type X and Type Y terminals. Variations are permissible which do not affect performance requirement, interchangeability or safety features of the terminals specified in this standard.

5.2.7 Adequate means of appropriate rating shall be provided for permanently connecting the terminals to cables and fixed wiring.

5.3 Cable Connector (Fig. 6)

5.3.1 The metal parts of the metal plug and female socket shall be encased in neutral rubber male and female cones such that live parts are fully isolated when they are joined together.

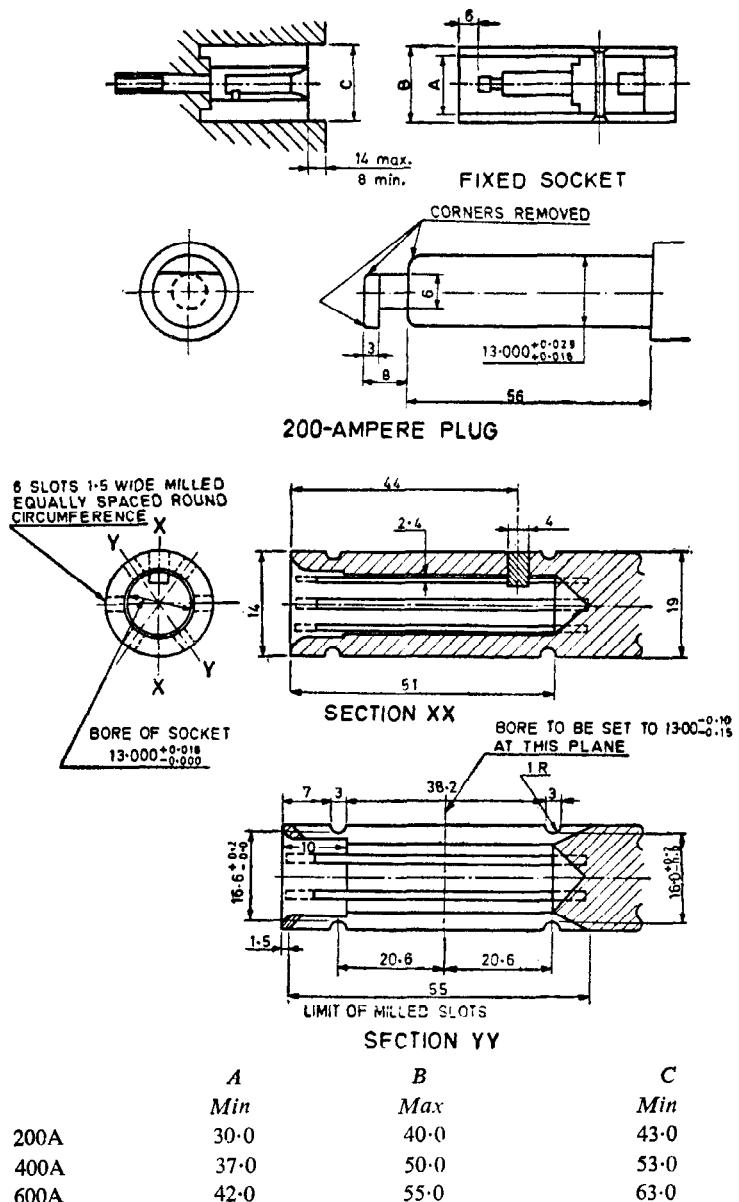
5.3.2 It shall be possible to lock the male plug adequately with the female socket to prevent accidental disconnection by means of a suitable retaining device.

5.3.3 The connector shall be robust in construction and shall be capable of maintaining efficient mechanical and electrical contact in normal use.

5.3.4 The construction of connector shall be such that no foreign particle liable to cause a risk of electrical shock may enter gaps, holes or other crevices and the live metal parts, such as the ends of screws and pins can become exposed.

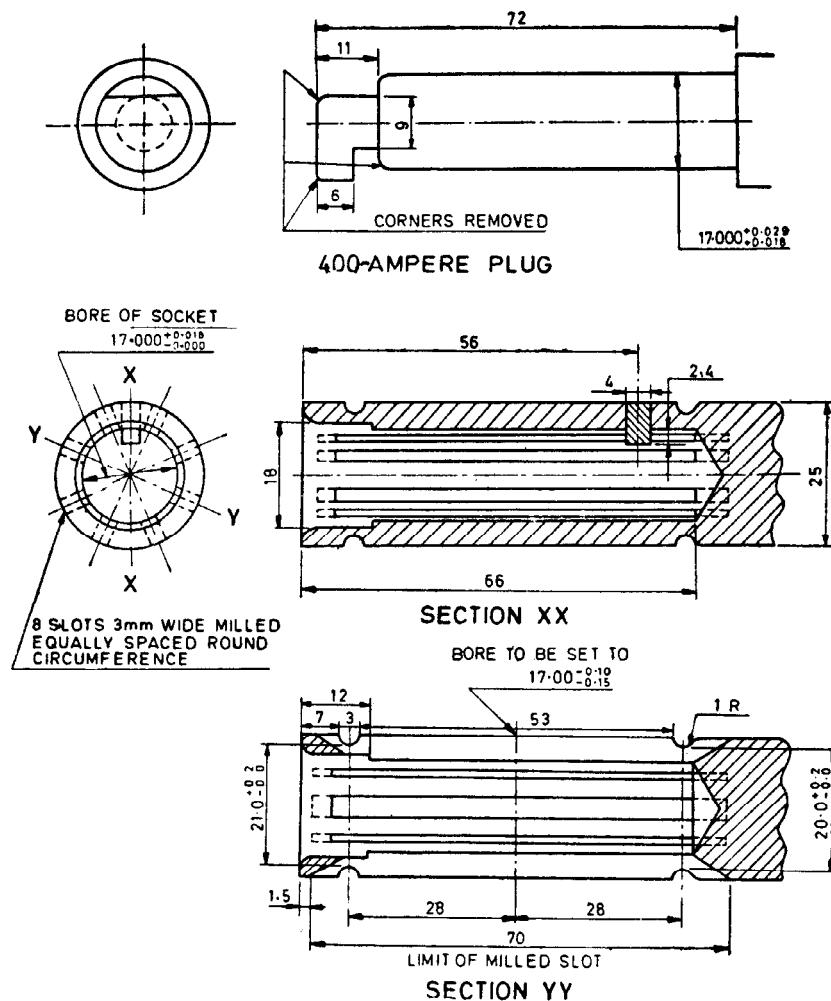
5.3.5 The insulation of the welding cable shall enter the male plug and the female socket to a depth of at least twice the outer diameter of the cable to minimize risk of damage due to flexing.

5.3.6 The basic and constructional details of the connector is given in Fig. 6 which is a typical sketch. Variations which do not affect the performance requirements, interchangeability or safety features of the connector specified in this standard are permissible.



All dimensions in millimetres.

FIG. 1A BASIC DESIGN OF 200-AMPERE PLUG AND SOCKET, TYPE A



All dimensions in millimetres.

FIG. 1B BASIC DESIGN OF 400-AMPERE PLUG AND SOCKET, TYPE A

5.3.7 The contacts shall be of ETP copper confirming to IS 191 (Part 5) : 1991 with spring loaded butt contacts of low resistance.

5.3.8 The material of the male plug and female socket and female socket cover shall be brass (Cu Zn 40 as per IS 4170 : 1967).

5.3.9 The spring shall be made of spring steel 55, Si 2 Mn 90 as per IS 1570 : 1961 exerting minimum and maximum contact pressures of 18.5 kg and 20 kg respectively.

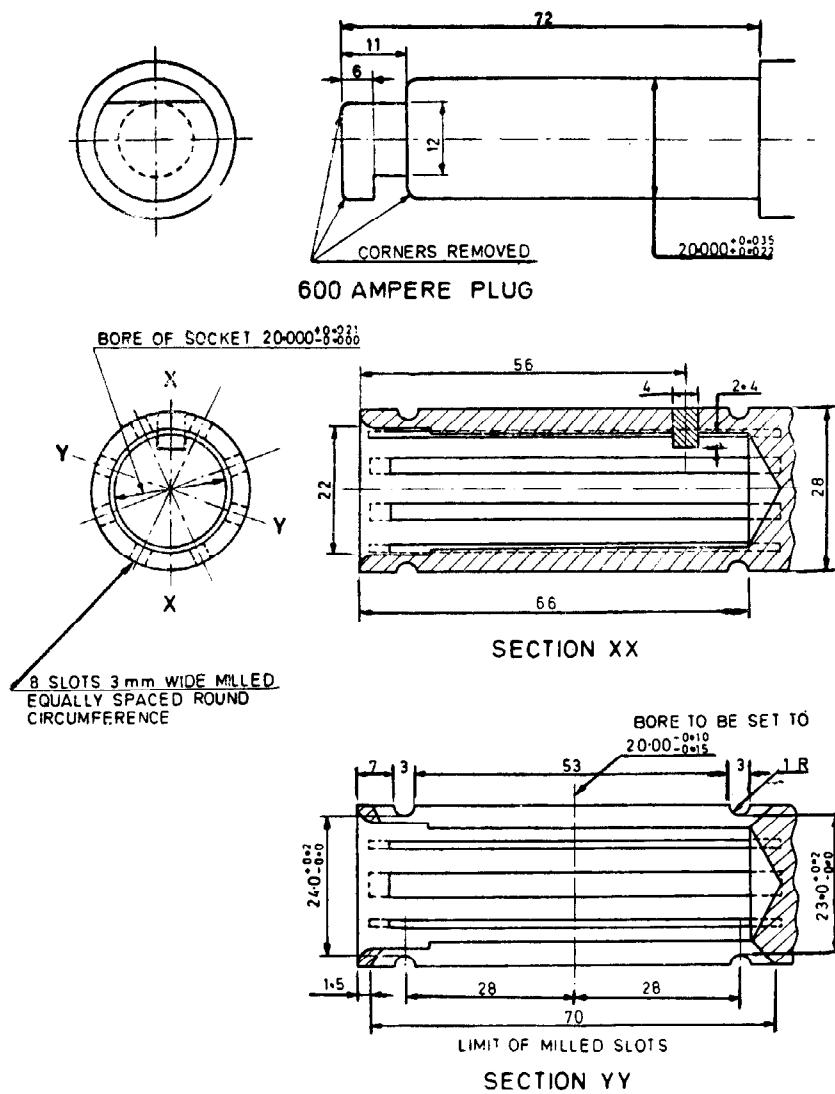
6 TESTS

6.0 Classification of Tests

6.0.1 Type Tests

The following shall constitute type tests:

- Temperature rise test (see 6.1),
- Insulation resistance test (see 6.2), and
- High voltage test (see 6.3).



All dimensions in millimetres.

FIG. 1C BASIC DESIGN OF 600-AMPERE PLUG AND SOCKET, TYPE A

6.0.2 Acceptance Tests

The following tests shall be carried out as acceptance tests:

- a) Insulation resistance test (see 6.2), and
- b) High voltage test (see 6.3).

6.0.3 Routine Test

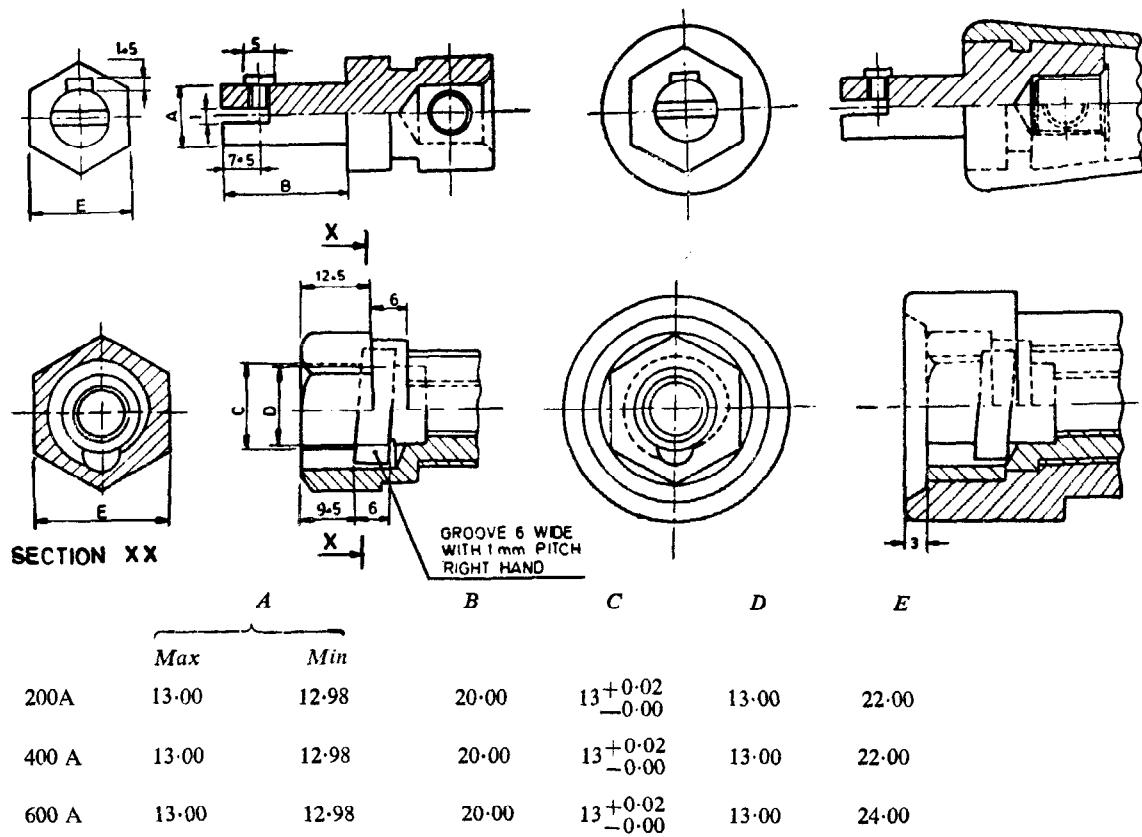
The following tests shall be carried out as routine tests:

- a) Insulation resistance test (see 6.2), and

- b) High voltage test (see 6.3).

6.1 Temperature Rise Test

When any of the specified terminal arrangements including plugs and sockets are fitted with correspondingly rated welding cables and rated current is passed through them for one hour, the temperature rise shall not exceed 60°C at any point over the outer metal surface of the terminals. The temperature rise at the junction of the cable or fixed wiring, as the case may be, and the terminal shall not exceed 70°C.



All dimensions in millimetres.

FIG. 2 BASIC DESIGN OF 200-, 400- AND 600-AMPERE PLUG AND SOCKET, TYPE B

6.2 Insulation Resistance

Insulation resistance shall be measured between the live parts and metal foil wrapped on the outer surface of the insulated part with a dc voltage of about 500 V applied for a sufficient time for the reading of the indicator to become practically steady. The insulation resistance shall be not less than 2 megohms.

6.3 High Voltage Test

The test shall be made with a single-phase alternating voltage as nearly as possible of sine-wave form and of any convenient frequency between 40 and 60 hz. Voltage of 1 kV rms is applied for 1 minute between the live parts and metal foil wrapped on the outer surface of the insulated parts.

6.3.1 No flash over or breakdown shall occur during this test.

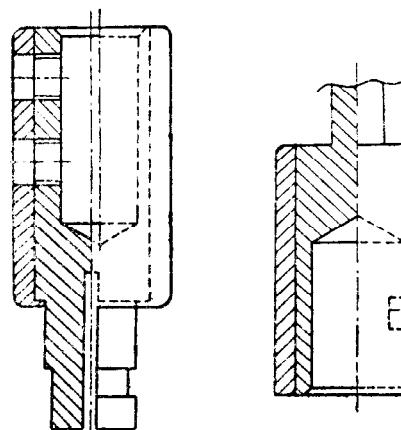
NOTE — Where no insulation is provided on the terminals before being fitted to the equipment, tests specified under 6.2 and 6.3 shall not apply.

7 MARKING

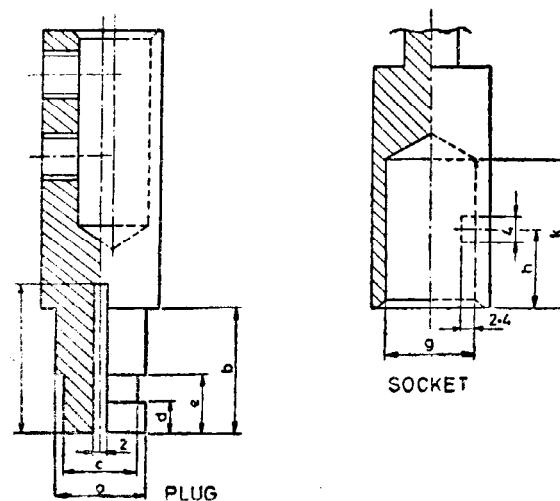
7.1 The following information shall be legible and indelibly marked on each plug and socket, terminal and cable connector:

- Source of manufacture ;
- Type of plug/socket, terminal and cable connector;
- Rated current (for 60 percent duty cycle); and
- Maximum cross-sectional area of the cable.

7.1.1 Plugs, sockets, terminals and welding cable connectors may also be marked with BIS Certification Mark.



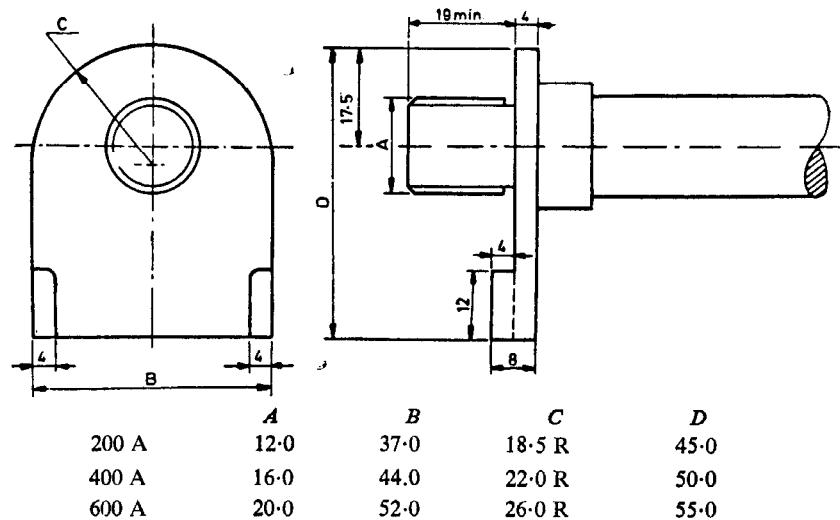
FIXED SOCKET



	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>k</i>	
	<i>Max</i>	<i>Min</i>								
200 A	12.73	12.72	56.0	6.0	3.0	8.0	61.0	12.7 $^{+0.10}_{-0.15}$	44.0	50.0
400 A	16.54	16.53	72.2	9.0	6.0	11.0	77.0	16.5 $^{+0.10}_{-0.15}$	56.0	66.0
600 A	20.54	20.53	72.0	12.0	6.0	11.0	77.0	20.5 $^{+0.10}_{-0.15}$	56.0	66.0

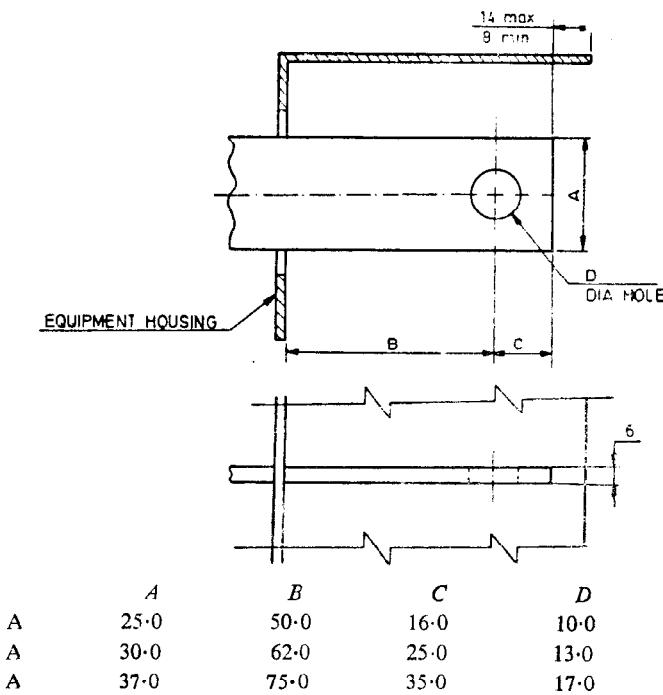
All dimensions in millimetres.

FIG. 3 BASIC DESIGN OF 200-, 400- AND 600-AMPERE PLUG AND SOCKET, TYPE C



All dimensions in millimetres.

FIG. 4 BASIC DESIGN OF TERMINAL 200-, 400- AND 600-AMPERE, TYPE X



All dimensions in millimetres.

FIG. 5 BASIC DESIGN OF TERMINAL ARRANGEMENT, TYPE Y

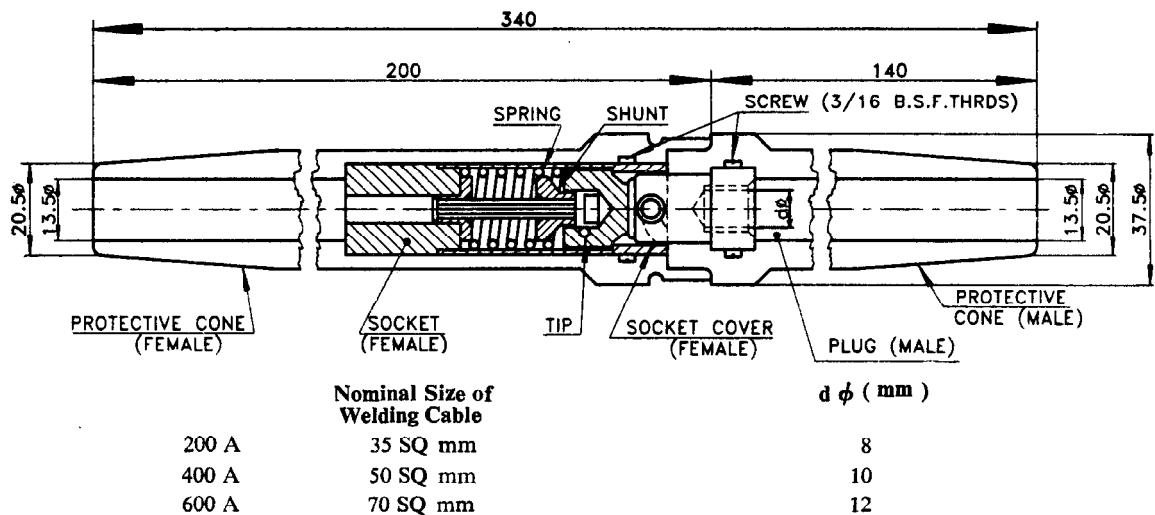


FIG. 6 WELDING CABLE CONNECTOR

Standard Mark

The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Revision of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc. No. ETD 21 (3325)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksantha
(Common to all Offices)

Regional Offices :

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	Telephone 331 01 31 331 13 75
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	37 84 99, 37 85 61 37 86 26, 37 86 62

Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	53 38 43, 53 16 40 53 23 84
--	--------------------------------

Southern : C. I. T. Campus, IV Cross Road, MADRAS 600113	235 02 16, 235 04 42 235 15 19, 235 23 15
--	--

Western : Manakalaya, E9 MIDC, Marol, Andheri (East) BOMBAY 400093	632 92 95, 632 78 58 632 78 91, 632 78 92
---	--

Branches : AHMADABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE.
FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR.
LUCKNOW. PATNA. THIRUVANANTHAPURAM.